Determination of the forecasting-model parameters by statistical analysis for development of algae warning system

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Abstract

The aim of this study is to determinate optimal model parameters for prediction of long-term forward (>1 month) chlorophyll-a (Chl-a) concentration in lakes. To optimize model parameters, water quality data from 93 lakes in South Korea were collected and analyzed. Among the 93 lakes, 30 problematic lakes were selected as study sites. Correlation analysis using Chl-a and other water quality data were conducted, and the results indicated that electrical conductivity (EC) and turbidity are important key parameters, which are less considerable than in previous research. To verify effectiveness of the selected parameters, one-month forward prediction of Chl-a concentration was performed using water quality data from the most problematic lakes in South Korea. Artificial neural networks were used as a
prediction model. The results of Chl-a prediction using selected parameters showed higher accuracy compare to using general parameters based on the literature reviews. EC and turbidity are important parameters, showing high correlation with Chl-a. This study will corroborate effective model parameters to predict long-term Chl-a concentration in lakes.

Keywords: Chlorophyll-a forecasting, Long-term forecasting, Correlation analysis, Artificial neural networks, Algae early warning system